



# FOREST CONTROL

## *by* CONTINUOUS INVENTORY

"---you shall not muzzle an ox when it is  
treading out the grain."

First Corinthians 9:9

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"Every tree is a qualified structural engineer. It computes the stresses and strains and lays on additional wood where it is most needed. Storms constitute periodic re-examinations, and those trees which do not pass the test lose their license to practice"

THOR JONSON, Engineer of  
the Swedish Forest Service

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Submitted by Fred Wilson of Madison, Wis.  
who is a Forester at Large  
working in retirement for the  
Good of the Profession



## THE IMPORTANCE OF TESTING THE ACCURACY OF FOREST INVENTORIES

October, 1956

Absoluteness cannot be the gauge of accuracy in timber inventories. We can be absolutely sure only, that we can never be absolutely sure of the timber cruiser's answers on large forest areas.

How good, then are these answers which we so painstakingly prepare for our executive staff? We cannot know until we test them and even then we will know only their relative accuracy.

Just as the inventory of the debris of once living things in Russel Cave, Alabama, gave evidence, through the radioactive carbon 14 test, of the presence of man 8,160 years ago--plus or minus 300 years-- so forest inventories also are made and tested on a give and take basis.

The important point is--the dependability of timber inventories must be known before the volumes are used in foresters' reports. The range of accuracy must be calculated by some standard testing process for the volumes within every important area breakdown used in the management of the forest. There may be as many as 50 to 150 of these area breaks and combinations thereof in every continuous forest inventory case.

It is unfortunately true that this test of the sampled volumes is seldom made for all area breaks. In the first place it is a difficult task by hand, and in the second place, the machine process is common neither to the manner of thinking nor to the way of life of woods-run foresters. They avoid it like a cruiser shuns a quaking bog. It is as astringent to their intellectual tastes as green persimmons are astringent to their palates; and so it is to mine. But it is also true that bogs must sometimes be crossed and that green persimmons will some day ripen.

Even where this ripening process has occurred there are other handicaps. There is resistance not only to the making of statistical checks, but also to the believing of them. Here we old-time foresters, and sometimes the company executives and the accountants are at fault.

"What is this you tell us?" these earnest gentlemen ask. "Are we to believe that it is good enough to know that we have one million cords of wood, PLUS OR MINUS TEN PERCENT, OR ONE HUNDRED THOUSAND CORDS? Don't you realize that one hundred thousand cords of wood are worth almost a quarter million dollars?"

"We cannot put up with such flagrant inaccuracy," they say. "Go back to the woods and take more samples."

So the poor forester, saddened and shamed, goes back to the woods where he works far beyond the point of diminishing returns to improve his answers an insignificant amount. He knows that he cannot do what he is asked to do. The best he can possibly do in the example given is to double the accuracy and this still leaves him with a sampling error of 50,000 cords. And to double the accuracy the number of samples originally taken must be multiplied by four.

Not only is sampling error always and forever present in forest inventories but there are also many other differences which cannot be reconciled with the doctrine of absolute perfection. There are, for example, mankind's natural carelessness, his faulty judgment, and his inability to make minute and refined measurements of trees. There are the endless changes, adulterations, restrictions, catastrophes and substitutions going on at all times in the woods. These things make exact answers impossible. They force us to be satisfied with ten to twenty-five percent accuracy, ninety-five times out of one hundred, for practical industrial forest planning and control.

These things also make it necessary to hold our volume and area breakdowns to a minimum and to provide the most simple means possible for the determination of the sampling error in inventories of large forest properties.

Watch succeeding newsletters for simplified electro-mechanical machine and hand-made examples of statistical checks of forest inventories.

CAL STOTT,  
Forester